

Schedule B

Development of the Project Highway

1 Development of the Project Highway

Development of the Project Highway shall include design and construction of the Extra Dosed/ Cable Stayed Bridge including Viaduct and approaches on Project Highway as described in this Schedule-B and in Schedule-C.

2 Rehabilitation and augmentation

Rehabilitation and augmentation shall include Two-Laning and strengthening of the Project Highway as described in Annex-I of this Schedule-B and in Schedule-C.

3 Specifications and Standards

The Project Highway shall be designed and constructed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

Annex – I

(Schedule-B)

Description of Two laning

1. Widening of the Existing Highway

- 1.1 The Project Highway shall follow the new alignment start from NH- 8 in Sabroom in the state of Tripura and end at R-152 Road in Bangladesh. The proposed bridge shall follow the new alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex III of Schedule-A.

1.2 Width of carriageway

1.2.1

The overall width of proposed bridge of 14.8 m shall be undertaken. The carriageway of the bridge shall be 10.5 m wide in accordance with the cross sections drawings give in GAD enclosed herewith.

The project road excluding other than viaduct and major bridges shall have 7 m wide carriageway with 1.5 m paved shoulder and 2.0 m earthen shoulder.

- 1.2.2 Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1.2.1 above.

1.2.3 Design Chainage corresponding to Existing Chainage

Existing Chainage (km)	Design Chainage (km)	Name of Place
New Alignment	0.000	Take Off Point of Project Road from NH 8 at Sabroom
	1.160	4 arm intersection at grade
	1.193	Start of Viaduct
	1.248	End of Viaduct/ Start of Bridge
	1.428	End of Bridge /Start of Viaduct
	1.605	End of Via duct
	1.888	Joining of Project Road with R 152 – Bangladesh

2. Geometric Design and General Features

2.1 General

Geometric design and general features of the Project Highway shall be in accordance with Section-2 of the Manual (IRC: SP: 73- 2015).

2.2 Design Speed

The design speed shall be the ruling design speed of 100 km per hour shall be adopted.

2.3 Improvement of the existing Road Geometrics

In the following sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided.

Design Chainage in km		Length in m	Type of Deficiency	Remarks
From	To			
NIL				

2.4 Right of Way

The proposed ROW is as below:

S. No.	Design Chainage (km)		Proposed ROW (m)
	From	To	
1	0.000	1.888	30

2.5 Type of Shoulders

- (a) In approaches, 1.5 m paved shoulder and 2.0 m earthen shoulders on both side is proposed.
- (b) In bridge portion, footpaths of width 1.5 m on both sides of the carriageway shall be provided.

2.6 Lateral and Vertical Clearances at Underpasses

2.6.1 Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per the paragraph 2.10 of the Manual.

2.6.2 Lateral clearance: The width/size of the opening at the underpasses shall be as follows:

S. No.	Existing Chainage	Design Chainage	Span (No. x length x ht.) in m	Minimum Length of RE wall	Remarks
NIL					

Note: RE wall length includes wall in front of abutments.

2.7 Lateral and vertical clearance at overpasses

2.7.1 Lateral and vertical clearances at over passes shall be as per paragraph 2.11 of the Manual.

No overpass

2.7.2 Lateral clearance: The size of the opening at the overpasses shall be as follows:

S. No.	Location (chainage) From km to km	Number and length of spans	Remarks
Nil			

2.8 Service roads/ Slip Road

Service roads, as per clause 2.12.2 of the manual, shall be constructed at the locations and for the lengths indicated below:

S. No.	Existing Chainage		Design Chainage		Length (m)	Width (m)	Side
	From	To	From	To			
NIL							

2.9 Grade separated structures

2.9.1 Grade separated structures shall be provided as per paragraph 2.13 of the Manual. The requisite particulars are given below

S. No.	Location of Structure	Design Chainage	Length (m)	Number and length of spans	Approach gradient	Remarks
NIL						

2.9.2 In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows:

S. No.	Location of Structure	Design Chainage	Length (m)	Number and length of spans	Approach gradient	Remarks
NIL						

2.10 Cattle and Pedestrian under pass / over pass

Cattle and pedestrian underpass/Overpass shall be constructed as follows:

S. No.	Existing Chainage	Design Chainage	Proposed span arrangement	width in m	Minimum length of RE wall
NIL					

2.11 Typical cross-sections of the Project Highway

Design Chainage in km		Length in m	Typical cross section
From	To		
0.000	0.230	230	As per manual
0.230	0.760	530	As per manual
0.760	1.193	433	As per manual
1.193	1.605	412	TCS- I
1.605	1.888	283	As per manual

Typical Cross Sections are attached at the end of Schedule-B.

3.0 Intersections and grade separators

All intersections and grade separators shall be as per Section 3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

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Properly designed intersections shall be provided at the locations and of types and features given in the tables below:

(a) At-grade intersections

i) Major Junction

S. No.	Existing Chainage	Design Chainage	Category of Road	Type of Junction	Remarks
1		0.000	NH/SH	3-legged	Start of project
2		1.160	NH/SH	4-legged	
3		1.888	NH/SH	3-legged	End of project

ii) Minor Intersection

S. No.	Design Chainage	Side (Left/Right)	Carriageway Width in m	
			Left	Right
NIL				

(b) Grade separated intersection with/without ramps

S. No.	Location	Salient features	Minimum length of viaduct to be provided	Read to be carried over / under the structures
NIL				

4. Road embankment and cut section

- 4.1** Widening and improvement of the existing road embankment/cuttings and construction of new road embankment / cuttings shall conform to the standards and specifications given in Section 4 of the Manual and the specified cross sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.
- 4.2** Raising of existing road. The existing road shall be raised wherever required as per section 4 of the manual.

5. Pavement design

- 5.1** Pavement design shall be carried out in accordance with Section 5 of the Manual. Contractor has to provide additional performance bank guarantee of 10% of the contract price valid up to a period 5 years from completion of construction of highway in case the Contractor intends to use any alternative material, technology/method, whether patented or otherwise, that is not specifically covered in the Indian or International Standards.

5.2 Type of pavement

Flexible pavement shall be constructed.

5.3 Design requirements

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5.3.1 Design Period and Strategy

Flexible pavement for new pavement and for widening and strengthening of the existing pavement shall be designed as per relevant paragraphs of Section 5 of the Manual pertaining to flexible pavements, for a minimum design period of 15 years. Stage construction shall not be permitted.

5.3.2 Design Traffic

Notwithstanding anything to the contrary contained in this Agreement or the Manual, the contractor shall design the pavement for design traffic of not less than 20 million standard axles (msa) from km 0.000 to km 1.888.

5.4 Reconstruction of stretches

Construction/ Reconstruction of the Project Highway shall be as per 'Manual Of Specifications & Standards For Two Laning of Highways With Paved Shoulder' (IRC: SP: 73-2015) referred in Schedule D.

6. Roadside drainage

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per section 6 of the Manual. Covered Drains and lined drain shall be provided in the following stretches.

Design Chainage		Location of Covered Drain in m	Side
From	To		
0.230	0.760	530	LHS & RHS

7. Design of structures

7.1 General

7.1.1 All bridges, culverts and structures shall be designed and constructed in accordance with Section 7 of the Manual and shall conform to the cross-sectional features and other details specified therein.

7.1.2 Width of the carriageway of new bridges and structures shall be as follows:

All new structures shall have minimum carriageway as per Manual Fig. 7.2 and Fig. 7.4

7.1.3 The following structures shall be provided with:

Footpath:	1500 mm on both sides of carriageway of Bridge portion
Crash Barrier:	450 mm on both sides between carriageway & footpath
Railing	200 mm on outer side of Footpath

7.1.4 All bridges shall be high-level bridges

7.1.5 Utility services to be carried over the structures

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The following structures shall be designed to carry utility services specified in the table below:

S. No.	Bridge at km	Utility service to be carried	Remarks
All New Bridges shall have provisions for utility services to be carried over			

7.1.6 Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections given in section 7 of the Manual.

7.2 Culverts

7.2.1 Overall width of all culverts shall be equal to the roadway width of the approaches.

7.2.2 Reconstruction of existing culverts:

The existing culverts at the following locations shall be re-constructed as new culverts:

S. No.	Design Chainage	Proposed Type of Structure	Recommendation	Proposed Span (m)	Over all Width in m
Nil					

7.2.3 Widening of existing culverts

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7 of the Manual. Repairs and strengthening of existing structures where required shall be carried out.

S. No.	Existing Chainage	Design Chainage	Proposed Type of Structures	Recommendation	Proposed Span (m)	Overall width in m
NIL						

7.2.4 Additional new culverts shall be constructed, as per figure 7.1A/7.1B of the manual, particulars given below:

S. No.	Design Chainage (km)	Proposed Type of Culvert	Span Arrangement No. x Length / No. x Dia (m)
1	0.060	Hume Pipe	1 x 1.2
2	0.144	Box Culvert	1 x 6 x 4.5
3	1.160	Box Culvert	1 x 2 x 2 (Agartala side)
4	1.160	Box Culvert	1 x 2 x 2 (Sabroom side)

7.2.5 Repairs/ replacements of railing /parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

Repairs/Replacement of railings/ parapets and any other defects noticed at the time of construction shall be undertaken by the contractor for all the retained culverts along with repair/construction of flooring and protection works.

7.2.6 Floor protection works shall be as specified in the relevant IRC Codes and Specifications

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7.3 Bridges

7.3.1 Existing bridges to be re-constructed/widened /Repairs

- i) The existing bridges at the following locations shall be reconstructed
- a) Major Bridges: NIL
- b) Minor Bridges: NIL
- ii) The following narrow bridges shall be widened/Repairs and Strengthened:

a) Major Bridges:

S. No.	Chainage (km)	Width (m)	Span Arrangement	Type of structure			Details of Widening
				Foundation	Sub structure	Super structure	
Nil							

Note: Widening of major Bridges is not applicable due to PSC Girder & SLAB type super structures. However repairs & strengthening of the bridge shall be carried out.

b) Minor Bridges:

S. No.	Chainage (km)	Existing width (m)	Span Arrangement	Type of structure			Details of widening
				Foundation	Sub structure	Super structure	
Nil							

Note: repairs /strengthening work also to be carried out along with widening.

c) Minor Bridges:

S. No.	Chainage (km)	Width (m)	Span Arrangement	Type of structure			Details of widening
				Foundation	Sub structure	Super structure	
Nil							

Note: Widening of minor Bridges is not applicable due to RCC T-BEAM & SLAB type super structures. However repairs & strengthening of major bridges shall be carried out.

7.3.2 Additional new bridges

New bridges at the following locations on the Project Highway shall be constructed

a) Major Bridge:

S. No.	Name of Bridge	Existing Chainage	Design Chainage	Proposed span arrangement	Remarks
1	Extra Dosed/Cable stayed Bridge	New Alignment	1.248	50 + 80 +50	3 span extra dosed bridge

b) Minor Bridge:

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S. No.	Name of Bridge	Existing Chainage	Design Chainage	Proposed span arrangement (No. x L)	Remarks
1		New	1.193	2 x 27.5	New 2-Lane Bridge as per Manual
2		Alignment	1.428	6 x 29.50	New 2-Lane Bridge as per Manual

7.3.3 The railings of existing bridges shall be replaced by crash barriers at the following locations:

S. No.	Location at km	Remarks
“As per site condition and where ever technically feasible”		

7.3.4 Repairs/replacements of railing/parapets of the existing bridges shall be undertaken as follows:

S. No.	Location at km	Remarks
In all the retained bridges which are proposed for widening, railing/ parapets shall be replaced.		

7.3.5 Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.20 of the Manual

7.3.6 Structures in marine environment: Nil

7.4 Rail-road bridges

7.4.1 Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual.

7.4.2 Road over bridges (road over rail) shall be provided at the following crossings, as per GAD drawings attached:

S. No.	Design Chainage (km)	Span Arrangement / length of span in m	Remark
Nil			

7.4.3 Road under bridges (road under railway line) shall be provided at the following level crossings, as per GAD drawings attached:

S. No.	Location of level crossing	Number and length of span
NIL		

7.5 Grade separated structures

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2.9 & 3 of this Annex-I

7.6 Repairs and strengthening of structures

The existing structures to be repaired/ strengthened, and the nature and extent of repairs / strengthening required are given below:

A – Bridges

i) Major Bridges

S. No.	Location of bridge (km)		Nature and extent of repairs/ strengthening to be carried out
	Existing Chainage	Design Chainage	
NIL			

ii) Minor Bridge:

S. No.	Existing Chainage (km)	Design Chainage (km)	Details of Repairing/Strengthening to be carried out

B – ROB / RUB

S. No.	Location of structure (km)	Nature and extent of repairs/strengthening to be carried out
NIL		

C – Overpasses/Underpasses and other structures

S. No.	Location of structure (km)	Nature and extent of repairs/strengthening to be carried out
NIL		

7.7 List of Major Bridges and Structures

The following is the list of the Major Bridges and structures

S. No.	Name of Bridge	Existing Chainage	Design Chainage	Proposed span arrangement (No. x l)	Remarks
1	Extra Dosed/Cable stayed Bridge	New Alignment	1.248	50 + 80 +50	3 span extra dosed/ cable stayed bridge

8. Traffic control devices and road safety works

8.1 Traffic control devices and road safety works shall be provided in accordance with Section 9 of the Manual.

8.2 Specifications of the reflecting sheeting: As per the Clause 9.2 of the Manual of Specification and Standards.

9. Roadside furniture

Roadside furniture shall be provided in accordance with the provisions of section 9 of the Manual.

9.1 Overhead traffic signs: location and size

S. No.	Design Chainage (km)	Remarks
1	0.000	
2	1.160	

10. Compulsory afforestation

The contractor is to plant trees as compensatory forestation as per as per IRC SP 21 and guidelines of the forest department.

11. Hazardous locations

The safety barriers shall also be provided at the following hazardous locations

S. No.	Location stretch from (km) to (km)	LHS/RHS
This shall be Provided at high embankment and at sharp curve location		

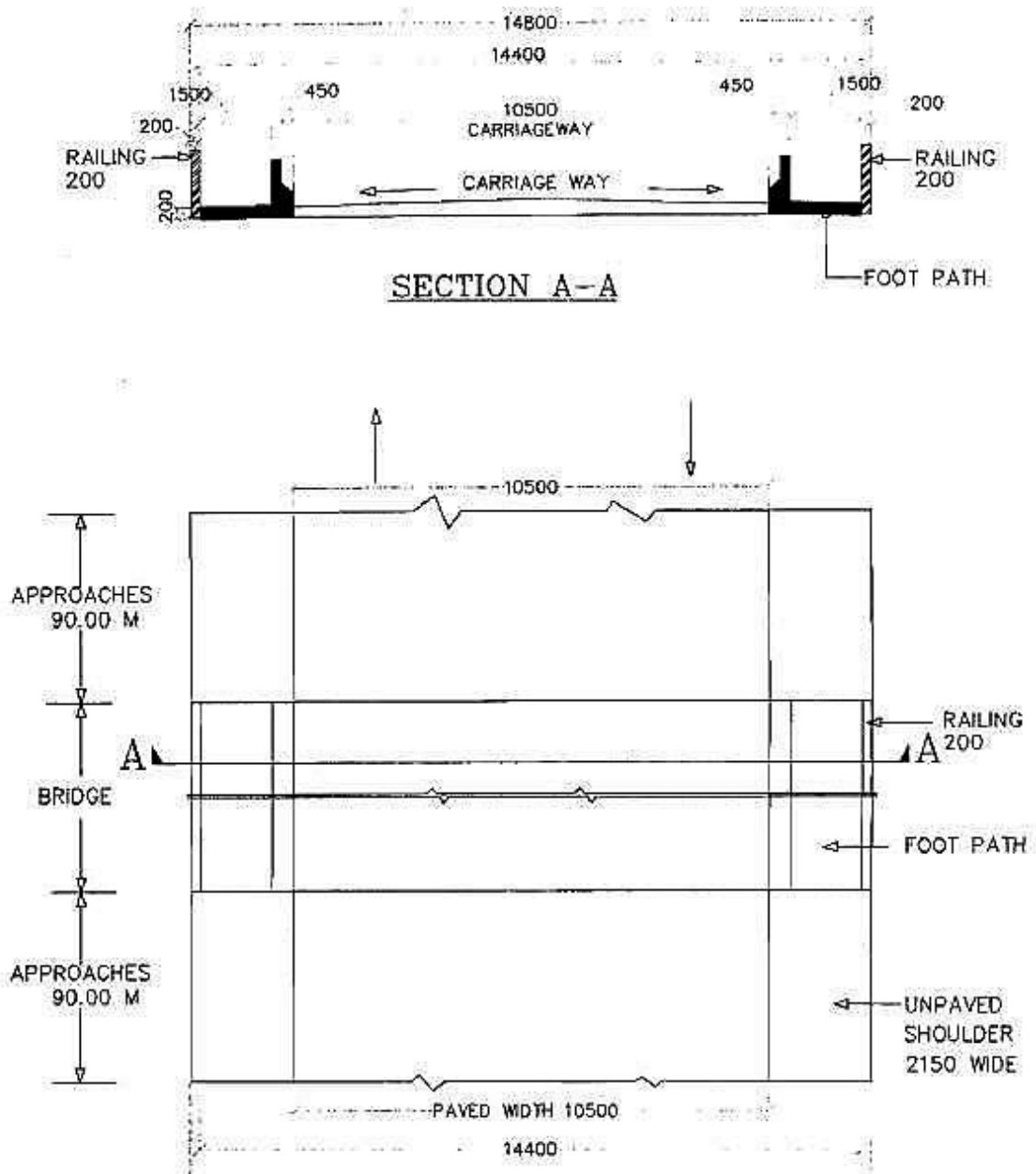
12. Protection work at Major Bridge:- Construction of Guide Bund and its protection work including flexible apron, boulder pitching and filter media.

Bridge No.	Length of guide bund		
	Up-Stream	Down Stream	Total (m)
As per Manual			

13. Change of Scope

The length of Structures and bridges specified herein above shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations in the lengths specified in this Schedule- B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

TCS- I



CONSTRUCTION OF EXTRA DOSED/ CABLE STAYED RCC BRIDGE INCLUDING VIADUCT AND APPROACHES OVER RIVER FENI AT SABROOM ON INDO-BANGLADESH BORDER ON NH-8 IN THE STATE OF TRIPURA ON EPC MODE.